Commentary: Prophylactic pulmonary vein isolation and postoperative atrial fibrillation: Continuous improvement is better than delayed perfection—Mark Twain

Niv Ad, MD

Postoperative atrial fibrillation (POAF) remains a common complication following cardiac surgery, especially if prophylactic treatment with amiodarone or beta-blockers was not used. There are several challenges in reducing the incidence of POAF effectively. This is largely due to the significant variabilities between surgeons’ practices even within the same institution. Willekes and colleagues1 sought to test the incidence of POAF following prophylactic pulmonary vein isolation and left atrial appendage amputation at the time of surgery. This randomized controlled trial included 62 patients >70 years of age undergoing coronary artery bypass graft and/or aortic valve replacement. The study is underpowered, and the rates of POAF seem high for the control group and uniquely low for the study group. Overall, the atrial arrhythmia rate was 13.8% for the study group, which is not different from studies using prophylactic amiodarone treatment.2

There are several questions that we should ask following this excellent feasibility study:

1. Does this study provide sufficient data to recommend prophylactic ablation in patients >70 years undergoing coronary artery bypass graft and/or aortic valve replacement to reduce POAF?

   The answer is no. A larger study should be designed to address safety, efficacy, and cost-effectiveness before any change in practice.

2. What is the mechanism of POAF and atrial arrhythmia in general?

   There is adequate information about predisposing factors leading to POAF, such as inflammation,3 mitochondrial dysfunction,4 and age. However, there is a gap in knowledge regarding the electrophysiological mechanism. We recently published findings based on surface mapping and electrocardiographic imaging that may suggest that POAF sustains a more complex electrophysiological mechanism outside of the pulmonary veins.5 Therefore, further investigation into the extent of the lesion set and treatment of a more complex mechanism are warranted. For example, in adult patients coming for a repair of atrial septal defect with no history of AF, it would be recommended to perform a prophylactic Cox-maze procedure.6

3. What is the appropriate definition for POAF?

   In order to accurately define POAF, it is essential to provide some clinical context. In some patients, it is seen in association with a complex operative and...
postoperative course. However, in many patients with a standard operative course, it occurs in the postoperative period before hospital discharge or even following discharge. The clinical significance of these different scenarios should probably be considered before deciding on a major shift in our practice. This study, as many others in recent years, is using the 30-second duration threshold to define POAF. The 30-second threshold is artificial and often not well associated with the clinical outcome. This is especially relevant for patients who developed POAF. I predict that the 30-second threshold is going to be changed to one that should include clinical impact, such as symptoms and risk of stroke. A new definition would be better is assessing the clinical impact and effectiveness of various treatments.

4. Lessons learned from more than 30 years of experience in surgical treatment for arrhythmia:

- Incomplete ablation lines may be arrhythmogenic; therefore, any future study should define the devices used to ablate and the appropriate technical process required to ensure transmurality of the lesions.
- Mitral valve isthmus–dependent atrial flutter may be the unintended consequence of bilateral pulmonary vein isolation in patients with arrhythmogenic atrial substrate.
- The incidence of POAF following surgical ablation for AF even when a full Cox-maze procedure was used is rather high.
- The left atrial appendage management must be taken into account.

References